

S4 Table. Genomic group classification using PCA and clustering methods

Subject	Gene			No. of types of variants			PCA			Clustering group
	C	P	M	C	P	M	PC1	PC2	PC3	
1	<i>KRAS</i>		<i>APC</i>	1	0	1	-0.790884979	0.784485667	-0.091802879	3
2		<i>PTEN</i>		0	1	0	-0.068844486	-0.191963543	0.015242436	1
3	<i>APC, TP53</i>	<i>KRAS,</i>		3	0	0	-0.737582053	0.784334917	-0.120969349	3
4				0	0	0	-0.066363153	-0.17710316	0.01124799	1
5				0	0	0	-0.066363153	-0.17710316	0.01124799	1
6	<i>TP53</i>	<i>VHL, FBXW7, KIT, BRAF, IDH2, ERBB2, TP53</i>		1	10	0	-0.201756073	-0.245943065	0.244468119	1
7	<i>APC, TP53</i>			2	0	0	-0.079863172	-0.208403266	0.013241679	1
8			<i>TP53</i>	0	0	1	-0.071226314	-0.201892393	0.020977216	1
9		<i>APC, TP53</i>	<i>CTNNB1, EGFR, CDKN2A, IDH2, STK11</i>	0	2	5	-0.155156681	-0.208707537	-0.020158508	1
10	<i>TP53</i>	<i>PIK3CA, CTNNB1, KIT, APC, EGFR, PTEN, ATM, HNF1A, KRAS, RB1, AKT1, TP53, GNAS, SMARCB1</i>	<i>KIT, MET</i>	1	24	2	-0.073856301	-0.391890387	1.994503644	1
11	<i>PIK3CA, KRAS</i>			2	0	0	-0.796916125	0.797027944	-0.089910309	3
12	<i>APC, KRAS</i>			2	0	0	-0.077303174	-0.251438715	0.039968526	1
13	<i>NRAS, TP53, SMAD4</i>	<i>APC</i>	<i>PTEN</i>	3	1	1	0.005146793	-0.166100342	-0.000630654	1
14			<i>TP53</i>	0	0	2	-0.069419631	-0.187115084	0.011971108	1
15	<i>MLH1, FBXW7, APC, TP53</i>		<i>RET</i>	4	0	1	-0.14714346	-0.49853149	0.020389135	1
16				0	0	0	-0.066363153	-0.17710316	0.01124799	1
17	<i>KRAS</i>			1	0	0	-0.773474032	0.763498019	-0.089030189	3
18	<i>KRAS</i>			1	0	0	-0.081310798	-0.23500673	0.01767282	1

19	<i>KIT</i>			1	0	0	-0.0096906	0.034738628	-0.064048072	1
20	<i>TP53</i>	<i>PIK3CA, CTNNB1</i>		1	2	0	0.044905119	-0.138165137	-0.129243797	1
21	<i>KIT, APC, KRAS, TP53</i>			4	0	0	1.283083082	0.771549681	-0.095977901	2
22	<i>MLH1, APC, KRAS, TP53</i>		<i>PIK3CA, CTNNB1, PTEN, RB1, TP53</i>	4	0	6	-1.087441325	0.646235111	-0.213342932	3
23	<i>KRAS, CDH1, TP53</i>			3	0	0	-0.176889568	-0.64715992	0.259143813	1
24	<i>PIK3CA</i>	<i>PIK3CA, CTNNB1, FBXW7, KIT, BRAF, CDKN2A, PTEN, KRAS, TP53</i>		1	20	0	0.733846104	0.043317926	0.14384993	2
25		<i>PIK3CA, APC, PTEN, TP53</i>		0	5	0	-0.000154863	-0.166144273	0.06726401	1
26			<i>PIK3CA, CTNNB1, MET, RET, TP53</i>	0	0	7	-0.061579237	-0.162024243	0.235939251	1
27	<i>KIT, APC, KRAS, TP53</i>			4	0	0	-0.81219582	1.077664248	-0.189468645	3
28	<i>APC</i>	<i>PIK3CA</i>		1	1	0	-0.035121947	-0.05159242	-0.039958848	1
29	<i>APC, KRAS, AKT1</i>			3	0	0	1.148948124	0.398900611	0.492893712	2
30	<i>KRAS, TP53</i>			2	0	0	-0.209362179	-0.775662912	0.136018568	1
31	<i>KRAS, TP53</i>			2	0	0	-0.228992992	-0.79467663	0.117181519	1
32	<i>FBXW7, KRAS, TP53</i>	<i>PIK3CA</i>		3	1	0	1.130329777	0.543739828	-0.105123912	2
33	<i>TP53</i>	<i>APC</i>		1	1	0	-0.16990347	-0.141999653	-0.048850218	1
34	<i>KRAS</i>		<i>TP53</i>	1	0	1	0.988099986	0.249100782	-0.095250319	2
35	<i>FBXW7, APC, KRAS, TP53</i>			4	0	0	1.0324908	0.267871739	-0.083282938	2
36	<i>PIK3CA</i>			1	0	0	-0.254894148	-0.076587093	-0.014311709	1
37	<i>KRAS, TP53</i>			2	0	0	1.010256116	0.335873417	0.025775455	2
38	<i>APC, KRAS, TP53</i>			3	0	0	-0.290307481	-0.843856744	0.121989315	1

39				<i>TP53</i>	0	0	1	-0.093973464	-0.1604457	0.007824752	1
40	<i>TP53</i>				1	0	0	-0.139794634	-0.22123124	0.007163196	1
41	<i>KRAS, TP53</i>				2	0	0	-0.201547849	-0.808946749	0.13227873	1
42	<i>TP53</i>			<i>PIK3CA</i>	1	0	1	-0.00288628	-0.130471814	0.221499597	1
43	<i>KRAS, TP53</i>	<i>RET</i>			2	1	0	-0.181972517	-0.165524622	-0.001892918	1
44	<i>MLH1, KRAS, TP53</i>				3	0	0	-0.261895151	-1.079331758	0.085040156	1
45	<i>PIK3CA, MLH1, APC, TP53</i>				4	0	0	-0.025181161	-0.352428433	0.2239822	1
46					0	0	0	-0.066363153	-0.17710316	0.01124799	1
47	<i>APC, TP53</i>				2	0	0	-0.065642546	-0.431550205	0.025024744	1
48	<i>PIK3CA, KRAS, TP53</i>	<i>TP53</i>			3	1	0	-1.038008112	0.926405967	-0.125461974	3
49	<i>KIT</i>				1	0	0	-0.0096906	0.034738628	-0.064048072	1
50	<i>FBXW7, APC, TP53</i>				3	0	0	-0.146890012	-0.168168119	0.006521864	1
51					0	0	0	-0.066363153	-0.17710316	0.01124799	1
52					0	0	0	-0.066363153	-0.17710316	0.01124799	1
53	<i>PIK3CA, APC, SMAD4, KRAS</i>			<i>TP53, SMAD4</i>	3	1	2	-1.301037852	1.211298565	-0.233244074	3
54	<i>NRAS, KIT, TP53</i>				3	0	0	0.101334037	0.080662739	-0.204049812	1
55	<i>PIK3CA, APC, KRAS</i>				3	0	0	0.988934663	0.356064697	-0.11935244	2
56	<i>TP53</i>			<i>KRAS</i>	1	0	1	-0.28945308	0.361219991	-0.141239708	1
57	<i>KRAS</i>				1	0	0	-0.069419631	-0.187115084	0.011971108	1
58	<i>TP53</i>				1	0	0	-0.029701993	-0.040902283	0.136687006	1
59	<i>KRAS, TP53</i>	<i>APC</i>			2	1	0	-0.087060587	-0.255514353	0.019433664	1
60	<i>KRAS, TP53</i>				2	0	0	1.005688507	0.475071581	0.029178938	2
61	<i>KRAS, TP53</i>			<i>PIK3CA, RET, RBI</i>	2	0	3	1.150396005	0.462346599	0.159470052	2
62		<i>CTNNB1, BRAF, KRAS, TP53</i>		<i>BRAF, TP53</i>	0	5	2	-0.517992508	0.283439279	-0.069322214	1
63	<i>KRAS</i>	<i>PIK3CA, BRAF, EGFR, CDKN2A,</i>			1	14	0	-0.043869053	-0.363494463	0.117012438	1

			<i>PTEN, KRAS, RBI,</i>									
			<i>TP53, STK11</i>									
64	<i>KRAS, TP53</i>			2	0	0	-0.081654779	-0.312467727	0.032757868	1		
65	<i>APC, KRAS</i>			2	0	0	-0.100969739	-0.320522514	0.00762719	1		
66	<i>KIT, KRAS,</i> <i>TP53</i>			3	0	0	1.042092639	0.364508358	-0.166659811	2		
67	<i>ABL1, AKT1,</i> <i>TP53</i>	<i>NRAS, VHL, APC,</i> <i>EGFR, TP53</i>	<i>NRAS, PIK3CA,</i> <i>EGFR, CDKN2A,</i> <i>KRAS, TP53,</i> <i>STK11</i>	3	8	16	0.237938634	0.469832121	4.576031415	1		
68	<i>KRAS, TP53</i>		<i>PIK3CA</i>	2	0	1	-0.145758226	-0.722050441	0.332890429	1		
69	<i>MLH1</i>	<i>KRAS, TP53</i>	<i>VHL, EGFR,</i> <i>CDKN2A, GNAQ,</i> <i>TP53</i>	1	3	6	-0.300507476	-0.811733286	0.033134605	1		
70	<i>TP53</i>			1	0	0	-0.069419631	-0.187115084	0.011971108	1		
71	<i>KRAS, TP53</i>			2	0	0	-0.089469109	-0.27918389	0.036497705	1		
72	<i>TP53</i>	<i>RET</i>		1	1	0	-0.147711067	-0.0807206	-0.079048597	1		
73	<i>KRAS</i>	<i>RET</i>		1	1	0	0.938127211	0.382769185	-0.130196985	2		
74				0	0	0	-0.066363153	-0.17710316	0.01124799	1		
75	<i>PIK3CA, KRAS,</i> <i>TP53</i>			3	0	0	-0.055529617	-0.220509289	0.120931054	1		
76				0	0	0	-0.066363153	-0.17710316	0.01124799	1		
77	<i>PIK3CA, BRAF,</i> <i>TP53</i>			3	0	0	-0.02763773	-0.120779667	0.178212031	1		
78	<i>PIK3CA, KRAS,</i> <i>SMAD4</i>			3	0	0	-0.233579401	-0.815786057	0.127615584	1		
79	<i>PIK3CA,</i> <i>FBXW7, KRAS,</i> <i>TP53</i>		<i>CTNNB1</i>	4	0	1	-1.111093124	0.878615648	-0.09233577	3		
80	<i>APC</i>			1	0	0	0.054120265	-0.153071944	0.233972638	1		
81	<i>PIK3CA,</i> <i>FBXW7, APC,</i> <i>KRAS, TP53</i>		<i>PIK3CA, PTEN,</i> <i>ATM, TP53,</i> <i>SMAD4</i>	5	0	7	-0.438287244	-1.037022154	0.069757371	1		
82	<i>PIK3CA, KIT,</i> <i>APC, KRAS,</i>			5	0	0	-0.969470911	1.300015427	0.094227372	3		

TP53

83	KRAS			1	0	0	-0.773474032	0.763498019	-0.089030189	3
84	KRAS, TP53	PIK3CA, KIT, APC, EGFR		2	7	0	-0.963910574	0.999288133	0.214319434	3
85	APC, TP53			2	0	0	-0.255383356	-0.01762929	-0.019155628	1
86	SMAD4			1	0	0	-0.12177587	-0.120315829	-0.022179926	1
87	KRAS, TP53			2	0	0	-0.269077228	-0.756392513	0.139456553	1
88	PIK3CA, KRAS, SMAD4	PIK3CA		3	1	0	-0.277300803	-0.048287622	-0.055081284	1
89	APC, CDH1			2	0	0	-0.103535904	-0.322344343	0.014195102	1
90	KRAS, TP53	RET		2	1	0	-0.841421118	0.853039913	-0.130872486	3
91				0	0	0	-0.066363153	-0.17710316	0.01124799	1
92	APC, TP53			2	0	0	-0.091533026	-0.347930295	0.012769035	1
93	FBXW7, APC, KRAS			3	0	0	-0.848161475	0.854993955	-0.101263944	3
94	KRAS, TP53, STK11			3	0	0	-0.250857564	-0.92263362	0.095131511	1
95	TP53			2	0	0	-0.072771247	-0.198326816	0.012793591	1
96	TP53			1	0	0	-0.029701993	-0.040902283	0.136687006	1
97	APC			1	0	0	-0.091189045	-0.270469297	-0.002316012	1
98		FBXW7, KIT, PTEN, ATM, KRAS		0	5	0	-0.420317169	0.341961275	-0.097845252	1
99	KRAS, TP53	PIK3CA		2	2	0	-0.766495991	0.986590206	0.037086133	3
100	APC, TP53	VHL, PIK3CA, PIK3CA, FBXW7, EGFR, ABL1, BRAF, RET, CDKN2A, ATM, PTEN, KRAS, PTPN11, KRAS, TP53, GNAS TP53		2	9	10	0.829759983	1.812791178	1.477840337	2
101	KRAS, TP53		ATM	2	0	1	1.037547224	0.363609108	-0.103617053	2
102		TP53	PIK3CA	0	2	1	0.074032572	-0.205775922	-0.276498757	1
103	KIT		TP53	1	0	1	-0.018082525	-0.000657081	-0.063973379	1
104	TP53	PIK3CA		2	1	0	0.291795204	-0.109174973	-0.59123969	1
105	APC, TP53	TP53	PIK3CA, PTPN11	2	1	2	0.078112366	-0.281793609	-0.336800852	1
106	APC, TP53	APC		2	1	0	-0.248063416	-0.02340174	-0.030128152	1
107	KRAS, TP53			2	0	0	-0.096141016	-0.265319069	0.029373143	1

108	<i>PIK3CA, APC, TP53</i>		<i>PIK3CA, PTEN</i>	3	0	2	-0.102430562	-0.192038675	0.003415103	1
109	<i>KRAS, TP53</i>	<i>PIK3CA, TP53</i>		2	2	0	0.213587579	-0.203815686	-0.482850013	1
110	<i>STK11</i>		<i>TP53</i>	1	0	1	-0.177606837	-0.200374285	-0.006541872	1
111	<i>PIK3CA, MLH1, APC, TP53</i>		<i>RET, TP53</i>	4	0	2	0.126791254	-0.390235738	-0.423270136	1
112	<i>PIK3CA, KRAS</i>	<i>APC, SMAD4</i>	<i>FGFR3, TP53, SMAD4</i>	2	2	4	-1.038567764	1.265355614	-0.414496407	3
113		<i>PIK3CA, CDKN2A, KRAS</i>	<i>KIT, TP53</i>	0	4	3	-0.433896888	0.304168568	-0.168811544	1
114	<i>CDKN2A, KRAS, SMAD4</i>	<i>TP53</i>		3	1	0	-0.07726416	-0.22277179	0.007805885	1
115	<i>PIK3CA</i>	<i>PIK3CA, ATM, TP53</i>		1	3	1	-0.005580161	-0.188583534	-0.168131276	1
116	<i>APC, TP53</i>	<i>KRAS</i>	<i>PIK3CA, APC, KRAS</i>	3	1	3	0.847370616	0.23228283	-0.427578301	2
117		<i>FBXW7, TP53, SMAD4</i>	<i>PIK3CA</i>	0	3	1	0.046460831	-0.180876478	-0.304026652	1
118	<i>TP53</i>	<i>SMAD4</i>		1	1	0	-0.122205285	-0.143330348	0.004294904	1
119		<i>PIK3CA, CDKN2A</i>	<i>PIK3CA, TP53</i>	0	3	2	0.080989166	-0.095974245	-0.299195566	1
120	<i>TP53</i>			2	0	0	-0.103286135	-0.193456576	-0.003358015	1
121	<i>FBXW7, CDKN2A, KRAS, TP53</i>	<i>PIK3CA, RB1, TP53</i>		4	3	0	1.489090465	0.533352812	-0.619158745	2
122	<i>TP53</i>		<i>PIK3CA</i>	1	0	1	-0.037983155	-0.262383776	-0.080108232	1
123	<i>TP53</i>	<i>PTEN, ATM, TP53, SMAD4</i>	<i>PIK3CA, PTEN, ATM</i>	1	4	3	0.066057832	-0.113400433	-0.414687471	1
124	<i>PIK3CA, KRAS, SMAD4, STK11</i>	<i>RET, TP53, SMAD4</i>	<i>PIK3CA, SMAD4</i>	5	3	2	-0.994023126	1.134967124	-0.524804126	3
125	<i>APC, KRAS</i>			3	0	0	0.050972199	-0.202379314	0.270887289	1
126	<i>KRAS</i>	<i>CTNNB1, NOTCH1, TP53</i>	<i>TP53</i>	1	3	2	1.116229715	0.386528307	-0.272820399	2
127		<i>TP53</i>	<i>PIK3CA, MLH1, KRAS, TP53</i>	0	1	5	0.027671722	-0.272783936	-0.261044213	1
128	<i>PIK3CA, KRAS</i>	<i>PIK3CA, ATM, RB1</i>		4	3	0	0.279838096	-0.248223036	-0.704500835	1

TP53

129	<i>APC, KRAS</i>		<i>BRAF, TP53</i>	3	0	2	1.390478925	0.608280423	0.073733862	2
130	<i>TP53</i>	<i>TP53</i>	<i>APC</i>	1	1	1	0.02434829	-0.222634625	-0.187325364	1
131		<i>PTEN, TP53</i>	<i>PIK3CA, APC</i>	0	2	2	0.095251042	-0.205026683	-0.299130842	1
132	<i>KRAS, TP53</i>	<i>BRAF, PTEN, TP53</i>	<i>ABL1, ATM</i>	2	4	1	1.211590075	0.386068493	-0.370233961	2
133	<i>FBXW7, KRAS, TP53</i>	<i>PIK3CA, TP53</i>		3	3	0	0.097627163	-0.157693743	-0.478731566	1
134	<i>APC, KRAS, TP53</i>	<i>PIK3CA, CDKN2A, TP53</i>		3	6	0	1.349579131	0.449250431	-0.499305458	2
135	<i>CTNNB1</i>	<i>PTEN, KRAS</i>		1	2	0	0.49653769	0.107578593	-0.01986156	2
136	<i>PIK3CA, KIT, TP53</i>		<i>KRAS</i>	3	0	1	0.689921146	0.259235204	-0.424350529	2
137	<i>MLH1, APC</i>	<i>KIT, BRAF, PTEN, ATM, AKT1, TP53</i>		2	7	0	-0.069213308	-0.398543339	-0.208765459	1
138	<i>PIK3CA, APC, KRAS</i>		<i>PIK3CA</i>	3	0	1	1.199034774	0.68939997	-0.175686278	2
139	<i>APC, TP53</i>	<i>APC, RET, PTEN, IDH2, TP53</i>	<i>VHL, CTNNB1, APC, BRAF, PTEN, ATM, KRAS, RB1, TP53</i>	2	6	13	-0.176625173	-0.483674066	-0.256825242	1
140	<i>TP53</i>	<i>ERBB4, PIK3CA, KIT, PTPN11</i>	<i>PIK3CA, CTNNB1, PTEN, KRAS, TP53</i>	1	4	6	0.210734748	-0.192853256	-0.530021519	1
141				0	0	0	-0.066363153	-0.17710316	0.01124799	1
142			<i>ERBB2</i>	0	0	1	-0.067856991	-0.181971514	0.011598289	1
143	<i>KRAS</i>			1	0	0	0.969027347	0.338870705	-0.096260078	2
144	<i>KRAS</i>	<i>SMAD4</i>		1	1	0	-0.205732979	-0.751593421	0.120843475	1
145		<i>KRAS, TP53</i>		0	2	0	0.472696538	0.104781422	-0.005709738	1
146	<i>TP53</i>			1	0	0	-0.069419631	-0.187115084	0.011971108	1
147	<i>NRAS</i>			1	0	0	-0.064752504	-0.182555091	-0.001146981	1
148				0	0	0	-0.066363153	-0.17710316	0.01124799	1
149				0	0	0	-0.066363153	-0.17710316	0.01124799	1

150	<i>APC, KRAS, TP53</i>		3	0	0	0.076892167	0.075265647	0.032690393	1
151		<i>APC, TP53</i>	0	3	0	-0.003706378	-0.170185337	0.207372421	1
152	<i>TP53</i>	<i>APC</i>	1	2	0	-0.172719929	-0.091634765	-0.022616717	1
153	<i>TP53, SMAD4</i>		2	0	0	-0.072771247	-0.198326816	0.012793591	1
154		<i>TP53</i>	0	0	1	-0.111560402	-0.195430551	0.020416628	1
155		<i>TP53</i>	0	1	0	-0.071349578	-0.187708635	0.010970487	1
156	<i>NRAS, KIT</i>		2	0	0	-0.010136919	0.036702459	-0.068165636	1
157	<i>APC, TP53</i>		3	0	0	-0.31776407	0.029557634	-0.033733707	1
158	<i>APC, TP53</i>		2	0	0	-0.255383356	-0.01762929	-0.019155628	1
